

# What You Need to Know About Emissions Markets

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# Topics

- U.S. Emissions Markets
  - Cap & Trade Basics
  - Implications for Green Power
  - Status of Key U.S. Emissions Markets
  - Green Power Claims Under Cap & Trade
  - Allowance Allocations
  - Value of Emissions Allowances
  - Challenges of REC Definition
  - Air Regulator's Perspective
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# U.S. Emissions Markets

- Existing examples
    - ❑ **SO<sub>2</sub> Trading (US EPA Acid Rain Program)**
    - ❑ **NO<sub>x</sub> Budget Trading (US EPA “SIP” Call)**
    - ❑ **Emission Reduction Credits (ERCs)**
    - ❑ **Houston-Galveston Area (HGA) NO<sub>x</sub>**
    - ❑ **RECLAIM (Southern California)**
  
  - Proposed programs
    - ❑ **US EPA Clean Air Interstate Rule (NO<sub>x</sub> & SO<sub>2</sub>)**
    - ❑ **US EPA Mercury Rule (Hg)**
    - ❑ **Regional Greenhouse Gas Initiative (RGGI)**
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# Cap & Trade Basics

**Goal:** Certain and cost-effective emissions reductions

## **Regulator**

- Sets an emission cap (annual/seasonal) for the sector (electric generators) for particular pollutant (e.g., SO<sub>2</sub>, NO<sub>x</sub>, Hg, CO<sub>2</sub>)
- Distributes allowances that permit emission of specified amount (usually one ton) of capped pollutant in particular year/season
- Establishes central entity/system to track allowances: owner, vintage (year), transfers, etc.
- Monitors & enforces compliance of emitters with requirements to
  - Measure & report emissions and
  - Hold allowances equal to actual emissions at end of year/season

**Emitters** meet requirements by

- Reducing emissions (adding controls, fuel switching, reducing operations) and/or
- Buying or selling allowances

# Implications of Cap & Trade

- Individual emitters do not have to meet any specific emission target
- Emitters with low control costs will “over control” and sell allowances to emitters with high control costs
- The market will operate such that total sector reductions are achieved at lower overall cost than with “command and control” approach
- Emitters will face significant increases in capital and operating costs and this will tend to raise electricity market prices, providing some incremental relative price advantage to non-emitting generators

# What This Means for Green Power

- Good news for cleaner air:
  - **Emissions will not exceed the cap**
  
- Inconvenient news for Green Power:
  - **Emissions will not be reduced below the cap ... even if new non-emitting generation comes on line**
  - **The only way to reduce emissions of a capped pollutant is to retire allowances**
  - Why?
    - Because excess allowances resulting from displaced generation from emitting facilities will be sold to & used by another emitter

# What This Means for Green Power

[Continued]

## ■ Good news for Green Power:

- **Renewable Energy becomes relatively more cost-competitive** and should require less of a premium
- Under a significant CO<sub>2</sub> cap this benefit could be on the order of **half a cent or more per kW-Hr**
- Full disclosure about this relative benefit to RE . . . . .
  - It's not large for NO<sub>x</sub> (~ one or two 1/10<sup>th</sup> of a cent per kW-Hr)
  - Can be less depending upon how allowances are allocated

## ■ Other news for Green Power:

- New non-emitting generation **will**:
  - Lower allowance prices and reduce need for emission controls
- Thus, RE can accurately claim . . . . **what exactly?**

# Bottom Line

- Increased renewable generation alone does not reduce capped emissions
- To reduce emissions, allowances must be retired
- However, even if emissions are not reduced, increased renewable generation does make “a contribution” (though, hard to describe) to reducing emissions to the cap level
- RE benefits from any Cap & Trade because it adds costs to fossil generation making RE relatively more cost-competitive



# Key U.S. Emissions Markets

## ■ Existing

- ❑ SO2 Trading Program
  - National, Annual
- ❑ NOx Budget Trading Program
  - Regional (19+ eastern states), Seasonal

## ■ Under Construction

- ❑ Clean Air Interstate Rule (CAIR)
  - NOx, ~29 eastern states, Annual
  - SO2, National, Annual, Tightens cap in Eastern US
- ❑ Regional Greenhouse Gas Initiative
  - CO2, ~10 northeastern states, Annual
- ❑ Mercury Rule
  - Hg, National. Annual

## ■ Anticipated?

# Cap & Trade Trends

- **Increasing** use of Cap & Trade approaches to reduce air emissions from electric generation and caps are getting **tighter and expanding geographically**
  - 48 states have at least one capped pollutant (SO<sub>2</sub>) and
  - many states may have three or four capped pollutants within the next five to ten years
  - NO<sub>x</sub> and SO<sub>2</sub> caps have tightened
- **Increasing variation** from state-to-state, region-to-region
  - Newer programs under the CAA (NO<sub>x</sub> SIP Call, CAIR and Hg Rule) give states the authority to determine their own allowance allocation approach
  - Increasing use and variety of allocation approaches different from original SO<sub>2</sub> approach (permanent, input-based)

# GP Claims Under Cap & Trade

## ■ If allowances are retired

- There is a reduction somewhere in the capped region
- “Cleaning the air & reducing 1.5 lbs NO<sub>x</sub>/mW-Hr.”

## ■ If allowances are not retired

- There is not a reduction in the capped region
- “Emissions free source in region with average emissions of 1.5 lbs NO<sub>x</sub>/mW-Hr”

- True regardless of whether allowances are given for free or bought

# One Way to Look at The Choice

## Scenario

- ❑ Wind project owner selling RECs to GP Marketer
- ❑ Wants to get \$10/mW-Hr to meet financial projections
- ❑ Receiving NOx allowances under annual NOx trading rule worth \$1.5/mW-Hr

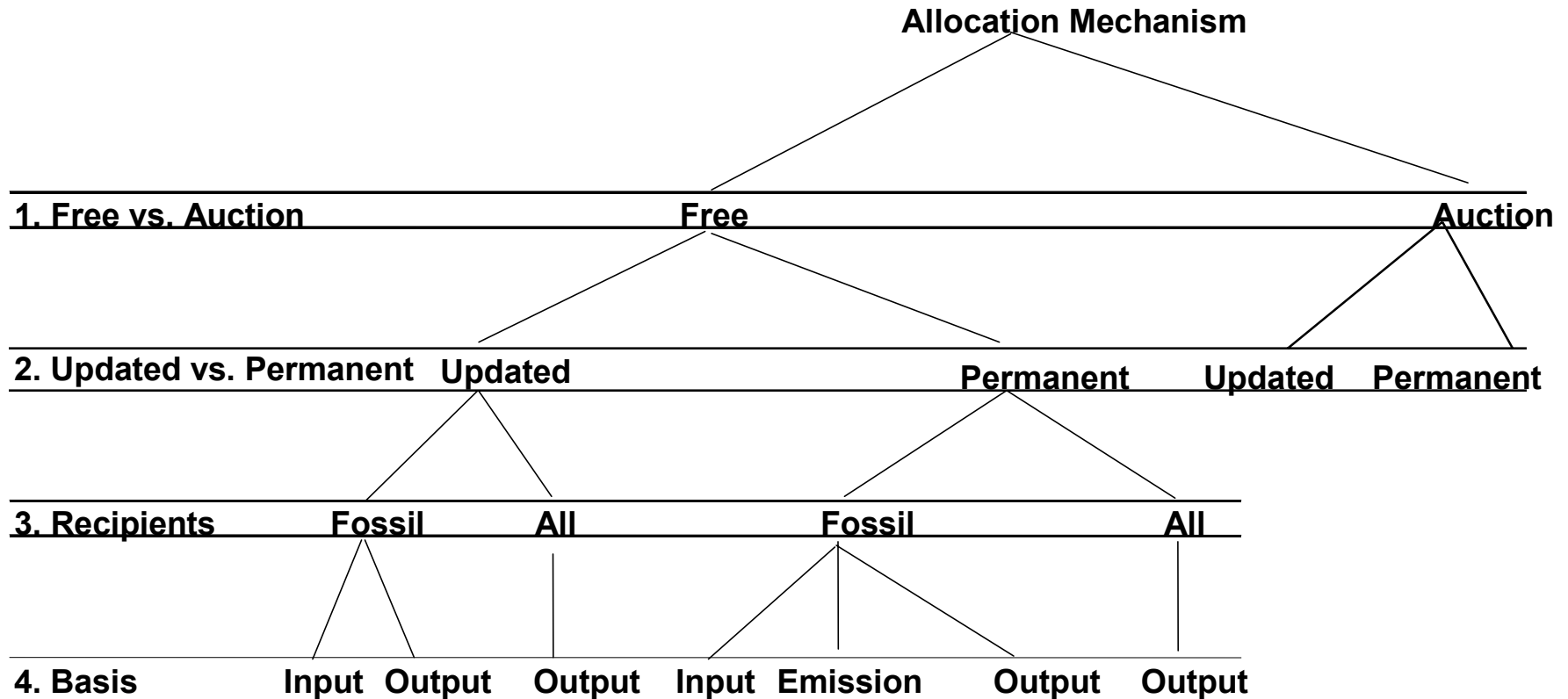
### ■ Option #1

- ❑ Sell NOx allowances to emitter for \$1.5/mW-Hr
- ❑ Sell RECs for \$8.5/mW-Hr
- ❑ Market RECs as “emissions free source in region w/ average emissions of 1.5 lbs NOx/mW-Hr”

### ■ Option #2

- ❑ Retire NOx allowances
- ❑ Sell RECs for \$10/mW-Hr
- ❑ Market RECs as “cleaning the air & reducing 1.5 lbs NOx/mW-Hr

# Overview of Allocation Options



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# Evaluating Effect of Allocation Approach on Renewable Energy

- Must consider impact on competitor's costs, market prices, and new/old RE
  - Some analysis indicates that new RE benefits ...
    - Most under auction
    - Some, but less, under updating allocations to all generation
    - Less still under permanent allocations or updating w/o RE
    - Always more than if no cap
  - Complex and difficult to evaluate
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# Potential Value of Emission Allowances

<b>Emission</b>	<b>Allocation Rate** (lbs/MW-Hr)</b>	<b>Allowance Price** (\$/ton)</b>	<b>Value (\$/MW-Hr)</b>
<b>NOX</b>	1.5	1,500	1.13
<b>SO2</b>	3	500	0.75
<b>Mercury**</b>	0.00816	40,000	0.33
<b>CO2</b>	1400	1 - 10	0.70 - 7.00
<b>Total</b>			<b>2.91 - 9.21</b>

\*\*For mercury only, allocation rate is in lbs/GW-Hr and allowance price is in \$/lb.

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# Challenges of Common REC Definition In Cap & Trade World

*“the bundle of non-energy attributes associated with generation of electricity at a renewable energy facility”*

- In existing markets, emissions are only reduced when allowances are retired and in many cases allowances are not allocated to RE
  - In anticipated markets, claims to emissions reductions are uncertain due to the indirect nature of RE emissions benefits and likely claim of same reduction by fossil generators
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# Air Regulator's Perspective on Cap & Trade

- Air quality programs should internalize (\$) air benefits of RE, leading to least cost strategies to objectives
    - Alternatively, internalize (\$) air impacts of other fuels
  - Air quality programs generally do not seek to
    - Maximize benefit to RE
    - Compensate for subsidies to other fuels or for RE non-air benefits
    - Address broader energy policy goals (e.g., fuel diversity, imports)
  - Objective is achievement of the cap level of emissions
    - with certainty
    - at lowest total cost
  - Interested in design issues affecting RE to the extent they can lower total compliance costs
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